Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Wireless Operations in the 3650-3700 MHz Band	)	ET Docket No. 04-151
	)	
Rules for Wireless Broadband Services in the 3650-3700 MHz Band	)	WT Docket No. 05-96
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	ET Docket No. 98-237

OPPOSITION OF MOTOROLA, INC.

Motorola, Inc. ("Motorola") respectfully submits this opposition to the petitions for reconsideration of the *3650 MHz Report and Order*[1] filed in the above-captioned proceedings by BRN Phoenix, Inc. ("BRN"),[2] and the Satellite Industry Association ("SIA").[3] As explained below, BRN's proposal runs counter to longstanding Commission policy against adopting one specific technical approach, and SIA's petition repackages arguments that the Commission fully considered and rejected in the *Report and Order*.

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1 *See Wireless Operations in the 3650-3700 MHz Band*, Report and Order and Memorandum Opinion and Order, ET Docket No. 04-151, FCC 05-56, Mar. 16, 2005 ("*3650 MHz Report and Order*" or "*Report and Order*").

2 *See* Petition for Partial Reconsideration of BRN Phoenix, Inc., *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, June 10, 2005 ("BRN Petition").

3 *See* Petition for Partial Reconsideration of the Satellite Industry Association, *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, June 10, 2005 ("SIA Petition").

Summary

The Commission released the *3650 MHz Report and Order* on March 16, 2005. The *Order* would have the Commission issue an unlimited amount of nationwide non-exclusive licenses in the 3650 MHz band, and thereby permit shared operation with all other users through implementation of "contention-based" protocols. Eight parties, including Motorola, sought timely reconsideration.[4]

Motorola's petition for reconsideration urged the Commission to revisit the decision to license the entire band on a non-exclusive basis and require implementation of contention-based protocols.[5] Motorola explained that exclusive licensing is a better path because it would offer licensees' certainty of spectrum access and allow the rapid deployment of broadband services that need a certain Quality of Service. Motorola recommended allocating the 50 MHz band in two 25 MHz blocks and auctioning the spectrum pursuant to Part 27 rules.[6]

In this filing, Motorola opposes the petitions for reconsideration filed by BRN and SIA. First, the Commission should deny BRN's Petition for Reconsideration to "designate the [Advanced Antenna System] AAS Standard" as the contention-based protocol for the 3650 MHz band. Not only would Commission adoption of a specific contention-based protocol run counter

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4 *See* FCC Public Notice, Report No. 2722, Petitions for Reconsideration of Action in Rulemaking Proceeding, 70 Fed. Reg. 43,429 (July 18, 2005).

5 *See* Petition for Reconsideration of Motorola, Inc., *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, June 10, 2005 ("BRN Petition"). *See also 3650 MHz Report and Order* at ¶¶ 55-58.

6 We note that other petitioners have proposed alternative methods for ensuring interference protection and quality of service in this band, such as through using, for example, coordination instead of auctions. Others have proposed exclusive licensing in a portion of the spectrum or in limited geographic areas. Motorola does not oppose these alternative methods, provided they offer sufficient interference protection and quality of service. Motorola looks forward to working with these parties and with the Commission to determine the best approach to achieve effective use of the spectrum throughout the U.S.

to the agency's sound policy of setting forth performance criteria and allowing the marketplace decide how best to achieve that performance, but also, as Motorola and other parties have noted, the design and implementation of *any* contention-based protocol by high-powered operations in this band is fraught with administrative and technical difficulties.[7]

Second, the Commission also should reject SIA's Petition, which asks the agency to adopt an out-of-band emissions ("OOBE") limit almost 30 dB more stringent that the level set forth in the new rules. SIA claims that the Commission "failed to adequately consider the unique sensitivity of FSS earth station receivers."[8] However, the Commission closely reviewed all comments in this proceeding, including comments of SIA and FSS operators on this same issue.[9] Motorola agrees with the Commission's recognition that "the protection criterion proposed by SIA [is] overly conservative and unsupported by either measurement or operational experience."[10]

I. THE COMMISSION SHOULD REJECT BRN'S PROPOSAL TO DESIGNATE THE AAS STANDARD AS *THE* CONTENTION-BASED PROTOCOL AT 3650 MHz.

BRN's request that the Commission adopt the AAS standard contention-based protocol at 3650 MHz should be denied for two basic reasons. First, the design and implementation of any contention-based protocol at 3650 MHz is strewn with a number of unsolved technical and administrative issues. Second, adoption of a specific contention-based protocol – especially one

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7 *See* Petition for Reconsideration of Motorola, Inc., *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, June 10, 2005.

8 SIA Petition at 5

9 *See Report and Order* at ¶¶ 61-66, 74-75.

10 *Report and Order* at ¶ 63 (discussing SIA's request that 25 W EIRP base stations be located at least 313 km away from grandfathered 3650 MHz FCC earth stations for adequate protection.").

that BRN has patented in part[11] – would be in direct contravention of long-standing FCC policy to set performance criteria instead of adopting one design or technical solution absent a compelling rationale.

As Motorola and others have explained, there are many unsolved problems with implementing any type of contention-based protocol in high-powered RF environments. The power levels set forth in the *Report and Order*[12] allow communications over areas of several miles in point-to-point applications and up to several thousand feet in typical mobile applications. In fact, BRN also has requested increased power in the band,[13] which will exacerbate these problems.

Contention-based protocols require RF transceivers to listen before transmitting so they transmit only when the channel is clear. Where the transmitting device can communicate over thousands of feet, there is a much greater probability that other uncoordinated users in that area also will be attempting to access the spectrum at that same time. Because more users are attempting to access the same spectrum, they must remain silent for longer periods of time to avoid interference. This reduces substantially the system throughput.

Moreover, it is very difficult for a radio that can transmit over a long distance to conclusively determine, prior to transmitting, whether it will be interfered with or interfere with

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11 *See* BRN Petition at 2 n.4.

12 *See Report and Order* at ¶¶ 50-52.

13 *See* BRN Petition at 2, 9-10. Alternatively, BRN requests a waiver to transmit at the higher power level and to use its patented Advanced Antenna System protocol. The Commission should deny the waiver request for the same reasons outlined herein.

others.[14] Problems such as hidden nodes present serious design challenges to manufacturers designing contention-based protocols at the higher power levels permitted at 3650 MHz.[15] Not surprisingly, the impact of these problems increases in densely populated urban areas where there are many tall buildings and many unaffiliated users. Because of these issues, Motorola and others have asked the Commission to adopt an exclusive licensing approach that would enable more efficient utilization of the 3650 MHz spectrum and allow deployment of technologies that require a certain Quality of Service.[16]

Notwithstanding these difficulties, if the Commission affirms the contention-based protocol aspect of the *3650 MHz Report and Order*, it would be ill advised to adopt the specific technical design put forth by BRN, especially one that BRN has patented. Instead, the general performance guideline outlined by the Commission should be affirmed. Because performance criteria define a desired outcome rather than mandate a specific design, they are best suited to achieve that outcome without restricting the means to achieving it. In this way, performance standards encourage innovative approaches to meet the required level of performance and remain

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[14] While contention-based protocols can perform acceptably in small areas and at low power levels, such as for Wi-Fi networks, even low-power operations are susceptible to interference. *See* David Pringle, *Wi-Fi Woes*, WALL STREET JOURNAL, July 18, 2005 at R11.

[15] The hidden node problem occurs when a signal that reaches a "hidden" receiver near to a sensing transceiver is drowned out by the transceiver's transmissions because the transceiver does not sense the nearby receiver or its incoming signal due to local terrain. *See* Petition for Reconsideration of Motorola at 5. Indeed, short-range wireless devices often build in 20 to 30 dB of margin, but this level would need to increase greatly for successful operation at 3650 MHz. *See also* Comments of Motorola, Inc., *Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies*, ET Docket No. 03-108, May 3, 2004, at 9-14.

[16] *See, e.g.,* Petition for Reconsideration of Motorola, Petition for Reconsideration of the Wireless Communications Assoc. Int'l, Inc., Petition for Reconsideration of Intel Corp., Redline Comms. Inc., and Alvarion, Inc., *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, June 10, 2005.

relevant through multiple product cycles. Not surprisingly, it is the policy of nearly every federal government agency – including the FCC – that standards adopting a specific technical design should be avoided where performance standards can accomplish the same purpose.[17]

II. THE COMMISSION SHOULD REJECT SIA'S PETITION FOR RECONSIDERATION BECAUSE THE ARGUMENTS WERE PROPERLY REVIEWED AND REJECTED.

SIA's Petition for Reconsideration attempts to recast the same arguments set forth in SIA's comments and reply comments on the *NPRM* in this proceeding. SIA is again seeking enhanced protection for FSS earth stations. As the *Report and Order* illustrates, SIA's position was analyzed closely by the agency in the context of the full record.[18] After careful consideration of the issues, the Commission found the protection criterion proposed by SIA to be overly conservative and unsupported.[19] SIA's Petition for Reconsideration repeats the same arguments and offers no new information and, therefore, should be denied.

SIA's Petition asks the agency to adopt an Out-Of-Band Emissions ("OOBE") level of -71.25 dBW/MHz – a level that is nearly 30 dB stricter than the level adopted in the *Report and Order*. SIA also claims that transmit power for the 3650 MHz devices will saturate the Low-Noise Block Downconverters ("LNB") of earth stations operating at 3700-4200 MHz.[20] SIA further claims that the interference impact from licensed mobile operations at 3650 MHz is no

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17 The Regulatory Flexibility Act requires U.S. Government agencies promulgating new regulations to consider using performance-based rather than prescriptive, design-based standards. *See* 5 U.S.C. § 603(c) (federal agencies' rulemaking analysis must discuss "significant alternatives such as – … the use of performance rather than design standards").

18 *See Report and Order* at ¶¶ 61-66, 74-75.

19 *See id*.

20 This scenario arises due to the satellite earth terminals receiver front ends having inadequate rejection for frequencies outside of the 3700-4200 MHz band for which they are licensed to operate, a situation that can easily be resolved by the satellite operators installing appropriate front end filters at the few sites which may be impacted.

different from unfettered unlicensed operation in the band, and thus requires a stricter OOBE level.[21]

SIA is wrong. The Commission weighed the merits of FSS operators' arguments that requested stricter limits.[22] Still, the agency imposed a limit (*i.e.*, 43 + 10 log(P)) that the agency found to be "very conservative, especially for coded digital signals [such as those that likely will be used at 3650 MHz] which generally decay more rapidly and produce lower levels of out of band emission[s] than analog signals."[23]

The Commission also took sound "steps to ensure that the locations of all terrestrial users are known."[24] First, it required each base station to be registered with the agency. Second, it required all mobile stations to positively receive and decode an enabling signal from a base station. Thus, should a mobile or base station be found to cause harmful interference to an FSS earth station, it will be identified easily and remedied.[25]

Because the Commission already carefully considered and rejected the same arguments set forth in SIA's Petition, it should deny reconsidering these arguments at this time.

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21 *See* SIA Petition at 10-11.

22 *See id.* at ¶ 75, n.150. In fact, the OOBE level proposed by SIA's Petition is stricter than the 60 + 10 log(P) level, proposed by FSS operators, that the Commission rejected. *See id*.

23 *See id.* at ¶ 75. The out-of-band emissions are consistent with those permitted by the ITU Radio Regulations. *See* Appendix 3 at Table II ("Attenuation values used to calculate maximum permitted spurious emissions power levels for use with radio equipment" and specify levels consistent with the Commission order (43+10 log (P) or 70 dBc, which ever is less stringent)).

24 *See Report and Order* at ¶ 61.

25 *See Report and Order* at ¶¶ 51, 61.

Conclusion

For the foregoing reasons, the Commission should deny the Petitions for Reconsideration submitted by BRN and SIA.

Respectfully submitted,

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CERTIFICATE OF SERVICE

On August 11, 2005, Motorola served the foregoing document by First Class mail upon the following representatives of BRN Phoenix, Inc., and the Satellite Industry Association.

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